Biodegrading ability and enzymatic activities of some white rot fungi on kenaf (Hibiscus cannabinus)

ABSTRACT

Lignocellulosic materials consist of lignin walls and cellulose fibrils that are bounded into lignin matrix preventing enzymatic activities to occur efficiently. Natural microorganisms such as fungi have the ability to break down this matrix and make the lignocellulosic components more accessible to enzymes. We report on the ability of four white rot fungi: Oxyporus latemarginatus, Rigidoporus vinctus, Phanerochaete chrysosporium and Coriolus versicolor, to degrade kenaf biomass. Fungi were inoculated separately onto kenaf medium and weight loss was determined after four weeks of incubation period. We observed O. latemarginatus as the fastest-growing fungus when compared with the rest and thus recorded the highest in biomass weight loss (3-fold higher). Filtrates from the fermentation were assayed for ligninase activity. All species produced high levels of lignin peroxidase (LiP), about the same amount of laccase except for P. chrysosporium and very low levels of manganase peroxidase (MnP). When analyzing for cellulase activities, all four species produced similar amounts of endoglucanase, exoglucanase and ɓ-glucosidase. Because of its consistently fast growth and high enzymatic activities, O. latemarginatus stands as a superior candidate in biological pretreatment of lignocellulosic biomass.

Keyword: Basidiomycetes; Biological pretreatment; Cellulose; Enzyme